# Murden Cove Watershed
# Nutrient and Bacteria Reduction Project

*A partnership of local agencies, local business, neighborhood schools, and citizen volunteers*

## The Watershed

The Murden Cove Watershed is located on the central eastern side of Bainbridge Island in mid Puget Sound (Figure 1). At a size of 2,041 acres, the Murden Cove Watershed is one of the largest watersheds on the Island. The primary stream in the watershed, Murden Creek, is comprised of a mainstem and two significant tributaries (Woodward Creek and Meig's Creek) totaling 3.7 miles. Along with several smaller drainages directly to the shoreline, Murden Creek delivers drainage to Murden Cove which encompasses the entire 3.3-mile shoreline of the watershed.


Figure 1

Land use within this watershed consists of various densities of residential, commercial and light industrial development, schools, and a portion of the Rolling Bay Neighborhood Service Center. The watershed encompasses 2.2 miles of State Highway 305 and 146 acres of parkland. There are agriculture and livestock farms spread throughout the watershed, and, while sanitary sewer services are provided for a small portion of the watershed, most land uses use onsite septic systems.

## The Problem

Murden Creek and Murden Cove provide recreational opportunities for humans as well as habitat for numerous aquatic species including shellfish and salmonids, specifically coho, chum, and cutthroat trout. However, Murden Cove's aquatic habitat is listed as impaired by the Washington State Department of Ecology due to low levels of dissolved oxygen and elevated levels of bacteria.

The City's status and trends monitoring in Murden Cove nearshore and Murden Creek reveals continued chronic high levels of bacteria and frequent low dissolved oxygen levels since 2007 (Figures 2 and 3). In addition, the cove periodically exceeds pH criteria and frequently fails to meet temperature criteria (Figure 4).

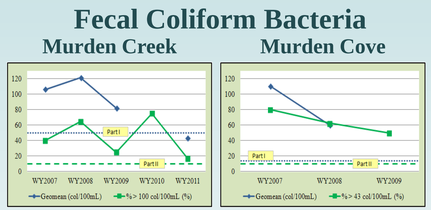


Figure 2

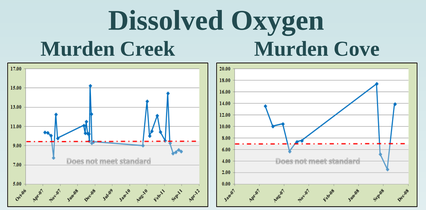


Figure 3

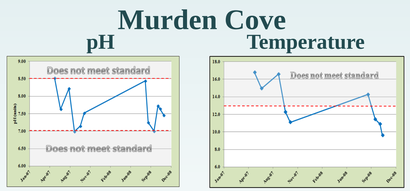


Figure 4

Monitoring during intense rain events in both water bodies in 2009 revealed increased nutrient levels such as phosphorus and nitrogen in both the creek and the cove, as well as ammonia concentrations exceeding chronic criteria (the creek) and acute criteria (the cove).

Murden Creek's benthic macroinvertebrate populations showed a marked decrease in the percentage of pollution *intolerant* species from 22% in WY2008 to 5% in WY2011 and an increase in the percentage of pollution *supertolerant* species from 11% to 15%.

## The Partnership

Given the numerous apparent water quality issues facing the Murden Cove Watershed, it was clear to many project partners that improving water quality conditions would require a comprehensive multi-agency and community investment. Thus, the Murden Cove Watershed Project Partnership was born.

The partnership includes the City, Kitsap Public Health District (source identification and correction, education and outreach, technical assistance to onsite septic system owners), Sakai Intermediate School/Islandwood (education and outreach, citizen volunteers), the Bainbridge Island Watershed Council (education and outreach, citizen volunteers), Kitsap Conservation District (technical assistance to farmers and horse-owners, education and outreach), and Farbank/Sage (social media and communications support).

In addition to providing funding from both the Water Quality and Flow Monitoring Program and the Illicit Discharge Detection and Elimination Program, the City serves as the project hub by providing monitoring training and oversight, coordination among partners, data compilation and analysis, data sharing, project effectiveness assessment, and project reporting.

The main objectives of this project are to define the severity and extent of the apparent water and habitat quality issues, to identify sources of nutrients and bacteria throughout the Murden Cove Watershed, and to provide educational outreach and technical assistance to watershed residents in order to reduce nutrient and bacteria input to the creek and the cove (see project map on reverse side).

## For further information

For more information or to volunteer, contact Cami Apfelbeck, Water Resources Specialist, at 206-780-3779 or capfelbeck@bainbridgewa.gov.